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ABSTRACT

An 800-mile canoe trip down a Canadian river provided the testing ground for the tenets of this trail food book. On the seven week expedition two pounds of food per person per day at a daily cost of $1.70 were carried. The only perishables were cheese, margarine, and onions. Recipes and menu ideas from that expedition are provided along with information needed in planning food for a long excursion in the wilds. The first chapter outlines background information on: (1) basic nutrition; (2) good sources of protein, carbohydrates and fats; (3) purchasing and packing food; and (4) trail cooking methods. Chapter two provides recipes, menu ideas, and sample meals for easy to prepare foods. The breakfast recipes include cooked and cold cereals, fried bulgar, granola, biscuits, donuts, pancakes, and scrambled eggs. Lunch recipes are based on such breads as bannock, logan, and oatmeal bars combined with cheese, peanut butter, salami, and other "munchies". Dinner recipes include a mixed grain dinner, various kinds of rices, chili, pasta, and chowders. Chapters two and three present information necessary to plan for winter expeditions, long trips, and group trips. A chart is given on the nutritional content of trail foods in portions commonly used. The last chapter tells how to figure the quantities needed per person. (DS)

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The Healthy Trail Food Book

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Dorcas S. Miller

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To Rena, who taught me the joy of cooking
and to Milford, who wouldn't let me put his name on the cover

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The Expedition

On July 1, 1975, five friends and I flew into Ivanhoe Lake near the headwaters of the Dubawnt River in the Northwest Territories of Canada. In the seven weeks which followed, we traveled almost 800 miles by canoe through the northern boreal forest and the tundra. The trip thoroughly tested the tenets of this trail food book. Except for fish and berries, we carried all our food with us, and depended on it for health and sustenance.

The menu was simple. There were four different breakfasts coupled with four dinners; lunch was the same every day. We carried enough staples to improvise quite a variety of treats, but the meals themselves were easy to prepare after a hard day. Rice for dinner every fourth day may sound tiresome, but trail life is uncomplicated and so were our tastes.

We carried approximately 2 pounds of food per person per day, totaling almost 600 pounds. The only perishables were cheese, margarine, and onions. Although I had packed parmesan cheese for the last two weeks, and menued no margarine for that time, we had extra cheddar and margarine through the end of the trip, and both lasted well.

As we were concerned about the lack of firewood on the tundra, I milled one fourth of the dinner meals to reduce cooking time, and we often made muesli from the oatmeal breakfast to save wood and gas.

The only items obtained through trail food suppliers were tomato crystals, sour cream powder, powdered eggs, dehydrated onions, and dehydrated peppers. All other food was purchased from co-ops, wholesalers, and supermarkets. We spent under $1.70 per person per day on food.

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The list in the last section details the food which we packed. I have made a few changes in amounts (we took too much sugar and powdered milk, not enough tomato crystals). I planned 2/3 c dry grain per person for breakfast, and only 1/3 c dry per person for dinner. This gave us more of the food when we needed it--at the beginning of the day. However, we often saved some biscuit mix to supplement dinner, and I would probably increase the portion to the normal 1/2 c dry for dinners.

Although it varied a bit, our average nutrition per day was:

3,753 calories per person

74.7 grams of usable, complemented protein per person

1,353 calories from fat sources, or 36% calories from fats

The protein and fat figures run well above the recommended daily intake, and the calorie count proved to be adequate. Although we carried vitamins, no one took them regularly, and no one seemed to suffer from vitamin deficiency. Except for some small changes, the six of us were quite satisfied with the quantity and quality of the food which we carried.

Beginnings- An Introduction

This book is written for people who want to eat simple, healthy food on trail. It contains a combination of learned-by-experience tips and research about nutrition. I have divided the book into four sections. The first part deals with basic nutrition; good sources of proteins, carbohydrates, and fats; purchasing and packing food; and trail cooking. Section two presents recipes, menu ideas, and sample meals. Section three, "The Charts," includes the technical data, in chart form, concerning the nutritional content of trail foods in portions commonly used. Section four shows how this information can be used to plan a long expedition.

The first chapter outlines background information and the second gives examples. These are designed for individuals who are embarking on their culinary careers, and for those who want basic food ideas. Chapters three and four provide the information necessary to design menus for winter expeditions, long trips, and group trips--times when proper nutrition is critical. I have divided the material in order that the technical data will not overwhelm those of beginning and casual interest, yet it will be available for precise menu planning.

At the start, however, a warning. People vary greatly with regard to food preference, caloric need, and actual ability of the body to use particular foods. Proteins and fats tend to be difficult to digest at high altitudes. Greasy food is unappealing on hot days. I lived on macaroni and cheese one summer because I couldn't eat the freeze-dried chicken tetrazzini; yet I learned to eat sausage fat on granola when I was winter camping. Some people have a high metabolic rate. Others have a very low one. No one person is average, despite the fact that measurements and quantities in this guide book are based on the average person. Menus calculated by the scientific method must be tempered to the trial and error of personal preference.

But the facts of nutrition are only half of the story; care and concern are the rest. Food prepared with love is healthier than food prepared in anger or haste. I cannot substantiate this statement through research, but it is true. It is also true that food I eat slowly and appreciate is better for my body than food I grab while taking down the tent. I could live on meat bars and dehydrated potatoes. I would spend no time preparing--or enjoying--my meals, and my life would be barer for it. I don't mean to objectify or glorify food. Rather, I would like to make it a joyful part of my outdoor experience.

And so, may I suggest holding hands with your companions for a moment before the meal . . . using chopsticks or a hand-carved spoon . . . eating from a wooden bowl or pottery dish. . .

Food is a gift, a communion, a creation.

The Basics

COMPOSITION OF FOODS AND NUTRITIONAL NEEDS

Food is composed of protein, carbohydrate, fat, vitamins, and minerals.

Protein

Proteins are made of amino acids. These amino acids are used to rebuild body tissue, provide energy, serve as catalysts for metabolic reactions, and make hormones. The need for protein is constant. Hard work does not accelerate tissue replacement, nor necessitate a higher protein intake.

Eight of the twenty-two amino acids are considered "essential" as they cannot be manufactured in the body and must be obtained in food. The human body needs these building blocks in specific ratios: one unit of tryptophan must be present with 3.2 units of lysine and 4.3 units of leucine, and so on.

Meat and dairy products most closely duplicate the amino acid pattern needed by humans. Although they are considered "complete" proteins they are wasteful of world resources. For example, beef cattle are fed approximately six pounds of grain to produce only one pound of beef.

Grains, legumes, nuts, and seeds also contain protein, though they are each short in one or two of the essential amino acids, with the result that all of the amino acids cannot be utilized. If a food has only 1/2 unit of tryptophan, then the body can use only 1-1/2 units of isoleucine and 2 units of leucine, regardless of how much isoleucine or leucine is present. The extra amino acids cannot be stored, and so they are burned in the catabolic cycle.

If another food strong in tryptophan were eaten at the same meal, it could supply the missing amino acid and increase the usable protein. This principle is the basis for protein complementarity: by matching the amino acid strengths and weaknesses of various foods, it is possible to produce a protein pattern similar to that needed by man.

It follows that protein can be measured in two ways. The gross weight is the total number of grams of protein in the item, and is the figure which appears in most nutrition books. The grams usable protein (GUP) is the number of grams that have the correct amino acid ratio. One scant tablespoon of peanut butter contains 3.9 grams gross protein, but as only 43% of the protein is properly balanced, only 1.6 grams are usable to humans. When combined with one teaspoon of powdered milk, which supplies the deficient isoleucine and lysine, the amount of usable protein increases to 2.2 grams.

The body needs approximately 0.42 grams of gross protein or 0.28 grams of usable protein per pound of body weight. That means average individuals need:

Woman	128 pounds	54 grams gross	35.8 grams usable protein
Man	154 pounds	65 grams gross	43.1 grams usable protein

The body cannot use a full day's protein at one time. Protein which cannot be used immediately, along with leftover incomplete protein, is burned or stored as fat.

Carbohydrates

Carbohydrates supply carlories in a quickly usable form, and are necessary to various metabolic functions. They provide "instant energy" rather than "staying power."

Fats

Fats supply fat-soluble vitamins and a high concentration of calories. They are not quickly digested, and provide a sense of satiation that carbohydrates lack. Along with proteins, they release energy over a long period of time, and are particularly important in long-term strenuous activity and in cold weather.

Vitamins and Minerals

The proper amount of vitamins and minerals can be obtained

through a balanced diet, but on long expeditions with no fresh food I usually carry a bottle of vitamin tablets.

Nutritional Needs

Individuals need approximately:

128 pounds 2,000 cal/normal day of sedentary activity

154 pounds 2,800 cal/normal day of sedentary activity

A day hike including 3 miles on roads, 10 miles cross country, and a gain of 2,500 feet in elevation might consume about 4,100 calories. Heavy manual labor burns between 4,000-4,500 calories per day, and the latter figure is listed by the United States Army as the standard strenuous duty requirement. Cold weather camping also calls for a high calorie intake as the body uses more energy to stay warm.

Energy is obtained from proteins, carbohydrates, and fats, but fats are by far the greatest source per unit of weight:

4 cal per gram carbohydrate

4 cal per gram protein

9 cal per gram fat

Eating three cups of margarine each day would provide the proper calorie count, but would certainly not produce a balanced diet. The recommended food source for calories is:

50% from carbohydrates

25-30% from proteins

20-25% from fats

However, I have found no information to indicate that the fat percent could not be higher. In fact, cold weather figures do run higher:

20% from carbohydrates

40% from proteins

40% from fats

While calculating caloric values of normal meals, I discov-

ered that liberal use of margarine in cooking fulfills the fat requirement, and that consistent use of powdered milk and cheese complements most of the proteins and fills the protein quota. The largest problem is to supply the full amount of calories, for it is nearly impossible to pack enough food for 4,500 calories per day for a long expedition.

I deal with this situation in several ways. Not every day is a 4,500 calorie day; most are less demanding, and occasionally I have a layover time when little energy is required. I pack extra margarine and oil and use them in cereal, dinner stews, and whenever I feel extra energy is needed. Also, my body has adapted to the rhythm of lean times and fat times. I stock up before and after a long trip. Last, I have a few spare pounds of fat. Each pound is worth about 3,000 calories, and losing just 5 pounds provides an extra 15,000 calories. This blessing is somewhat deceiving, however, for I carry the weight either way--on my body or in my pack.

PROTEIN SOURCES: COMPLEMENTARY PORTIONS

Most research concerning protein complementarity has been conducted using chick peas and black beans, rice, sesame seeds, and milk. As each item is representative of its food group (legumes, grains, nuts and seeds, and dairy, respectively) it is probable that other items in the food group can be substituted with similar results.

Complementary portions are based on figures in ***Diet for a Small Planet*** by Frances Moore Lappé and ***Recipes for a Small Planet*** by Ellen Buchman Ewald.

Equivalent Quantities

1/2 c soybeans	= 1/2 c soy grits 1 c soy flour
1/4 c non-instant dry milk	= 1 c milk (liquid) 1/3 c instant dry milk 1/3 c grated cheese 1-1/3 oz cheese
1 c peanut butter	= 1-3/4 c nuts
1 c flour	= 3/4 c bulgar 1/2 c wheat berries 1 c rolled grain (oatmeal, etc.) 5 slices commercial bread 1 c pasta (dry)

The following items have generally high complementary relationships:

milk products ---------- grains

legumes ---------- grains

legumes ---------- seeds

Some Complementary Proteins

2/3 c	rice	: beans	1/4 c
1/2 c	rice	: soy	1 T grits
1/2 c	rice	: milk	1/4 c non-instant dry
1/2 c	rice	: wheat & soy	3/8 c bulgar 1/4 c grits
1/2 c	bulgar*	: milk	2 T non-instant dry
1/2 c	bulgar	: beans	2 T
1/2 c	bulgar	: soy	1 heaping T grits
1/2 c	bulgar	: soy & sesame	1 T grits 2 T seeds
1/2 c	flour or rolled grain	: milk	1 T non-instant dry
1/2 c	flour	: soy	1 T grits
1/2 c	flour	: peanut & milk or soy	1 T peanut butter 1 T non-instant dry 1/2 T grits
1 c butter	nuts	: milk	6 T non-instant dry
3/4 c	nuts	: sunflower	1 c seeds
1-1/2 c	nuts	: soy & sesame	1/2 c soybeans 1 c seeds
1 T butter	nuts	: sesame	1 T sesame butter
1 c	cornmeal	: soy & milk	2 T grits 1/4 c non-instant dry
1 c	cornmeal	: beans	1/4 c
1/3 c	beans	: milk	3 T non-instant dry
1/3 c	beans	: sesame	1/2 c seeds
1 medium	potato	: milk	1/4 c non-instant dry

By using food equivalents in the above proportions, an immense variety of high-protein dishes are possible. In ***Recipes for a Small Planet***, Ms. Ewald presents a number of savory recipes, many of which are adaptable to trail use.

* Although wheat and rice have similar amino acid patterns, Ms. Lappe has indicated different complements:

1/2 c rice : 1 T soy grits
1/2 c wheat : 2 T soy grits

I have followed her recommendation.

CHOOSING AND PACKING FOOD

The food I take depends on how and where I carry it. On rafting trips, I can use a great deal of fresh food and canned goods because the raft holds the weight. When backpacking I am much more careful about weight. On short trips I can take bread instead of crackers or flatbread, fresh fruit instead of dried fruit. When I cook with a stove, I plan quick-cook meals with little baking.

Another determining factor is cost. Although freeze-dried meals can be made palatable, I find the cost prohibitive. In addition, I prefer to eat food with as few preservatives and chemical additives as possible. I have used grains as the basis for most menu planning, and although they are heavier than freeze-dried items, they are much more economical.

Some people prefer to pack food by meal and by day. Others like to take bags of staples and cook from a "pantry." I do both: pack the basic meal items, by day, and carry a quantity of staples (flour, oil, honey, etc.) for baking. With a large group, it is easiest to package by meal so that there is less chance of winding up with no breakfast on the last day.

When I know a trip will be demanding, and that my energy for cooking will be limited, I sometimes pack "instant meals": oatmeal, sugar, salt, margarine, raisins, powdered milk, and sunflower seeds go into a sealed bag, and I have only to pour it into boiling water for a hearty yet easily prepared breakfast. When I plan a slower trip, or when I go out with students, I carry an extra large pantry, so that each of us may encounter the joys--and the frustrations--of trail cooking.

About wild foods: don't count on them. While blueberries, clams, and labrador tea have supplemented otherwise unexciting meals, it is dangerous to assume that they will be there. They may not. I would rather have a delightful surprise than a hungry night.

When packing out a trip, include something special--a bag of fig bars, a cup of real Columbian coffee grounds, a particular herb tea--small items which serve as great morale boosters.

Stove Cooking

Cracked grains (cracked wheat, soy grits) and parboiled grain (bulgar) need less cooking time, and so use less gas. Whole grains and legumes cook faster if coarsely ground in a flour mill. In addition, soaking grains like peas, bulgar, lentils, and rolled oats during the day or overnight reduces cooking time. Pastas cook more quickly than whole grains or legumes, though noodles do not provide as much protein per gram as grains. Granola and muesli provide a nutritious, no-cook breakfast.

Buying Trail Food

Most of the foods in the following pages are available through co-ops, health food stores, and supermarkets. Cross check prices: sometimes items are less expensive in the supermarket, even with a co-op discount. For a large expedition, buying in bulk is essential.

Bulk orders for dehydrated vegetables, tomato crystals, sour cream powder, and other items may be placed through a number of suppliers. Two well known companies are:

Perma Pak
40 East 2430 South
Salt Lake City, Utah 84115

Bernard Food Industries
1125 Hartrey Avenue
Box 1497
Evanston, Illinois 60204

For a short trip with a small group it would be more convenient to purchase these items from the local supermarket, as more and more dehydrated food is appearing on grocery shelves.

Abbreviations

t	=	teaspoon	lb	=	pound
T	=	tablespoon	oz	=	ounce
c	=	cup			

Conversion Tables

As staples are usually sold by the pound rather than the cup, here is a handy chart:

1 pound =

2+ c grain	5 c instant dry milk
5+ c oatmeal	3 c dry fruit
4 c flour or biscuit mix	3 c chocolate chips
4 c macaroni	2 c margarine or crisco
3 c nuts and seeds	2 c sugar
1-3/4 c peanut butter	1-1/3 c honey
4 c non-instant dry milk	

\+ indicates slightly more than a level cup

Also:

3 t	=	1 T	28.5 grams	=	1 oz
4 T	=	1/4 c	16 oz	=	1 pound
8 fluid oz	=	1 c			

Spices

Spices make the difference between wallpaper paste stew and a culinary creation. I carry a large spice pack:

salt and pepper	chili
parsley	red peppers
onion powder	curry
garlic powder	cinnamon
thyme	nutmeg
tomato sauce spice (mix 2 t parsley; 1 t oregano; and 1/4 t each of thyme, rosemary, garlic, sage; plus 1 bay leaf.)	

Thoroughly cleaned plastic pill bottles, often available at the drug store, make good spice jars.

Odds and Ends

All vegetable margarine keeps better than butter or margarine containing milk solids.

Whole dry milk has more fat, and therefore more calories, than the non-fat variety.

Cheese keeps well if prepared in the following manner: cut the block into daily portions, wrap each piece in cheese cloth, and dip in hot wax. Double bag with plastic as the oil can leak from the wax seal. Cheddar cheese prepared this way lasted through one week of very hot weather plus seven weeks of cooler Canadian tundra climate, and tasted as good as the day it was packed. Mozzarella, Jarlsburg, Swiss, and parmesan cheeses seem to keep best in hot weather.

Soy grits do not influence the flavor of food as much as soy flour does.

To avoid lumpy milk, pudding, and sauces, always add liquid to powder: put dry mix in a bowl and slowly add the desired amount of water, stirring constantly. The opposite technique (pouring pudding mix into a pot of water) will result in unchangeable lumps.

To dry fruit and vegetables for use on trail, slice the item into 1/8" thick pieces, place on oven racks, turn oven on warm, and let the food dry for several hours. Or, set rack in a warm place and let dry for several days, watching for mold. For better flavor and appearance, the food may be blanched before drying. *Putting Food By*, written by Ruth Hertzberg, Beatrice Vaughan, and Janet Greene is a good reference.

Creativity

In the end, common sense and creativity are the stand-bys of trail cooking. If I don't have, then I make do. If I cook for a group, I'm less flamboyant than when I cook for myself, but I always add a touch of something different. Dehydrated apples and bisquick turn into apple pie. Milk, margarine, and freshwater clams make clam chowder. Biscuit mix becomes coffee cake, donuts, cheese fritters, or dinner rolls. Experiment!

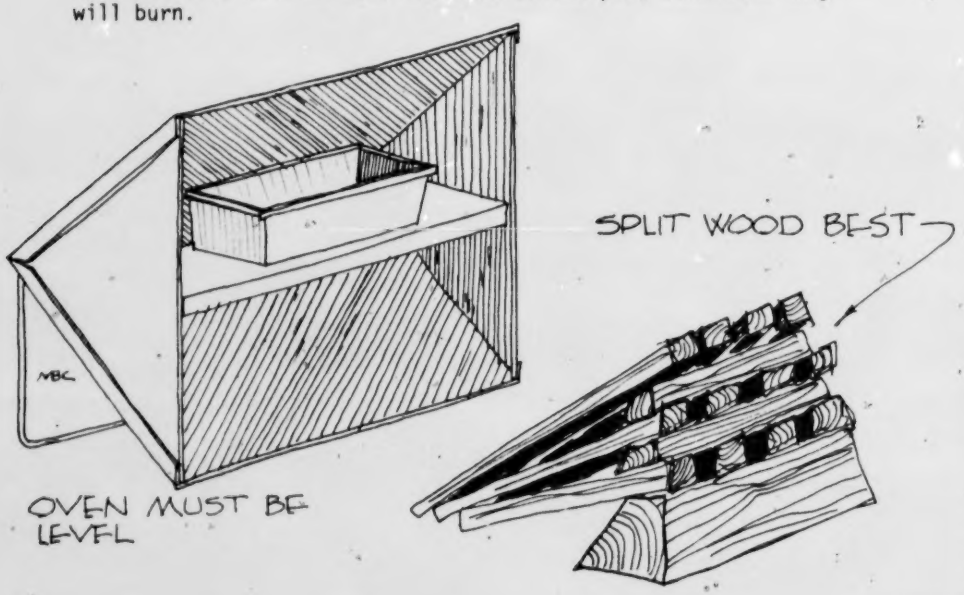
BAKING ON TRAIL

"However can you bake on trail?" my neighbor asked. Here are a few methods, standard and improvised.

Reflector Oven

A reflector oven is an aluminum device which reflects heat from the fire and bakes quite nicely if used properly. It is available at most camping stores and comes with directions.

A bread pan can serve as an improvised reflector baker. Make small rolls or biscuits and place them on the side wall of the bread pan. Set the pan next to the fire or grill so that it will catch the heat and reflect it onto the rolls. Watch the rolls carefully, and switch them after five minutes so that the side near the fire will be near the back of the pan; otherwise they will burn.



Dutch Oven

Dutch ovens are available in cast iron and aluminum form. These also may be improvised, using any pot or frying pan with a secure lid:

a. Make a bed of coals.

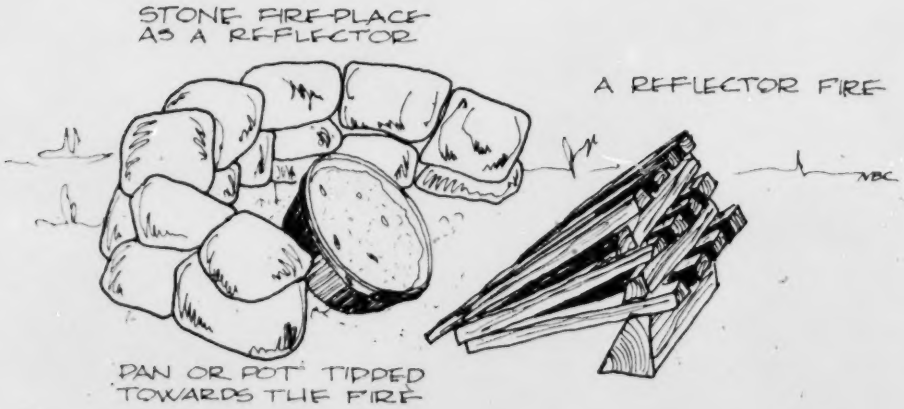
b. Place a few small rocks amid the coals to keep the pot or frying pan bottom slightly up off the heat.

c. Cover pot and place hot coals or even a small fire on the lid.

d. Replenish coals as needed, and don't peek. Constant checking lets out the hot air, and ruins the oven effect. Cooking time is comparable to a kitchen stove, if coals are hot.

If a frying pan but no lid is available, put several 1" thick sticks in the fire, let them half burn, and then lay them across the pan. Some ashes may get in the bread, but there will be few complaints. With a good bed of coals underneath, cooking time should be the same as with a regular Dutch oven.

Once I made an oven on trail by taking the grate off the fire place, laying the wood along the open end, and banking the fire to burn inward. I pulled embers into the middle of the pit and placed the bread pan on them. The three sides of rock reflected heat, and the bread baked evenly. Just before removing, I tipped the bread toward the fire so that it would brown.



Double Boiler: Baking with a Stove

When there is extra gas but no firewood, cakes can be baked on a gas stove by using the double boiler principle:

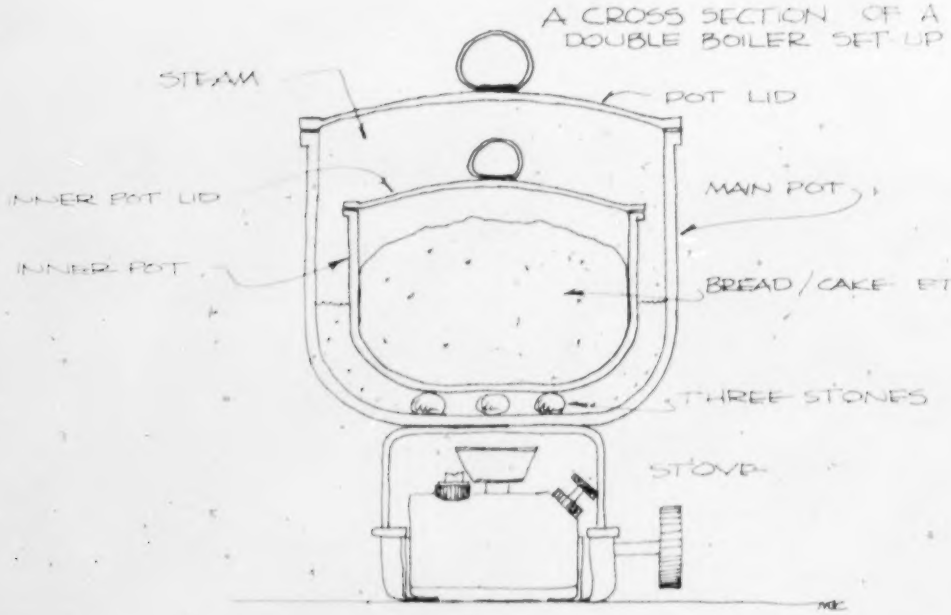
a. Put about 2/3 c water in the larger of two nesting pots.

b. Put the cake batter in the smaller pot, and slip it inside the larger one.

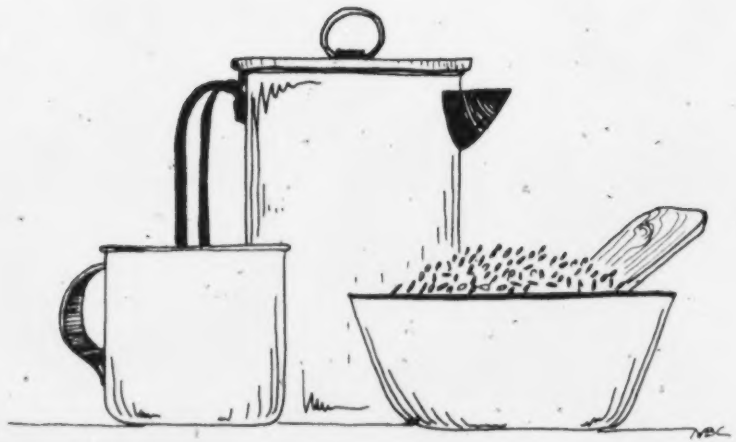
c. Put lids on both pots, place whole on stove.

d. Boiling water will steam heat and cook the cake. Make sure the pot does not boil dry.

In any case, thin baked goods turn out better than thick breads and cakes, as there is less chance of underbaking.



The Recipes



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Most camping foods are of the "mix and macch" variety. Rather than prescribing raisins in oatmeal on Day 1 and sunflower seeds in bulgar on Day 2, I have presented basic cooking directions and suggested combinations. The table which follows each meal gives nutritional values for common meal items. In the following recipes, 'dry milk" is non-instant powdered milk.

BREAKFAST

Cooked Cereals

Rolled oats, rolled wheat, rolled rye, cracked wheat, and any combination of the above grains make excellent hot cereals. Per person:

Boil:	1 c water	
Add:	1/2 c cereal	1 T soy grits
	dash of salt	2 T dry milk

Stir thoroughly and cook on low heat until done, 15-20 minutes. Mixing the milk with the grain before adding to the water prevents the milk from lumping.

In this meal, complements are: 1 T soy grits : 1/2 c cereal. The 2 T dry milk also balances the grain if soy grits are not available.

Honey, sugar, nuts, sesame seeds, sunflower seeds, margarine, raisins, and other dried fruits are all good additions to hot cereals.

Fried Bulgar

Fried bulgar provides a change of pace for breakfasts. Per person:

Soak overnight: 1/2 c bulgar in 1 c water

Next morning, drain if necessary and add: 3 T cubed cheese (1/2 oz.)
2 T chopped onion
salt, pepper, garlic powder

Fry in oil or margarine

Complements are: 1/2 c bulgar : 3 T cheese

Granola

There are as many granola recipes as there are cooks. Here is a basic recipe which can be easily modified to personal taste.

Combine:
- 1/2 c vegetable oil
- 1/2 c honey
- 1 T vanilla
- 1 c dry milk
- 1 c wheat germ
- 1 c soy grits
- 1/2 t salt
- 7 c rolled grain (wheat, rye, oats)
- 1 c sunflower seeds
- 7/8 c peanuts

Spread into large baking pan and bake at 350 for one hour, stirring occasionally. When the granola is golden and toasted, remove from the oven and add:

- 1 c coconut
- 2 c raisins or other dried fruit (dates are very good)
- 1/2 c honey

The following quantities are complementary:
- 7 c grain & 1 c wheat germ : 1 c soy grits
- 1 c sunflower seeds : 7/8 c peanuts

This recipe makes 14-15 servings of 1 c per person.

Muesli

Muesli is an easy cold cereal breakfast which is made up the night before and left to soak.

Combine:
- 3 c rolled grain
- 1/4 c sunflower seeds
- 1/4 c nuts
- 1/2 c raisins
- 1/2 c dried fruit, chopped
- 2 t cinnamon
- 1 c sour cream powder
- 1/2 c milk powder
- 5 c water
- 1/2 t salt

Stir well. Mixture will be soupy, as the rolled oats will absorb water overnight.

Muesli is also an excellent breakfast at home, and can be made with yogurt and fruit juice instead of sour cream powder and milk.

Complementary portions are:
- 3 c rolled grain : 1 c sour cream powder & 1/2 c milk powder
- 1/4 c nuts : 1/4 c sunflower seeds

Serves 6.

Whole Wheat Biscuit Mix

Biscuit mix can be made up dry and combined with water as needed on trail. It is a food of many uses, for it can be made into pancakes, biscuits, pie dough, coffee cake, dumplings, and any other flour based food. Protein values are substantially higher for these whole wheat products than for the commercially available equivalents. Extra powdered milk or soy flour will increase protein content.

Combine: 1 c white flour
1 c whole wheat flour
2 t baking powder
1 t salt
2 T shortening or oil
1/4 c powdered milk

This makes a little more than 2 c biscuit mix.

Complementary portions are: 2 c flour : 1/4 c powdered milk

Biscuits

Add 1/3 c water per 1 c biscuit mix. Bake in reflector baker or Dutch oven. Makes about 6 biscuits.

Donuts

Combine: 1/3 c water
1 c biscuit mix
2 T honey
1 t cinnamon

Stir well and knead until smooth. Roll out to 1/2" thick. Cut into crueller donuts about 4" long and 1/2" wide. Fry in hot fat, removing when golden brown. Makes 12-15 small donuts.

Whole Wheat Pancakes

Combine: 1/2 to 1/3 c water
1 c biscuit mix

Cook in well greased pan. One cup makes about 7 pancakes.

Sour Dough Pancakes

Sour dough is another food which can be used for many dishes--pancakes, biscuits, bread. The starter must be carried in a flexible container, as it expands as it sours and warms. A large Gerry tube or even a plastic baby bottle can serve this purpose.

To make the starter, mix: 1 T dry yeast
2 c warm water
2 c flour

Cover with cheese cloth and tie with string. This allows wild yeast to enter the starter, but keeps out insects and dirt. Allow to stand 1-2 days. Mixture will develop a strong alcoholic smell. If it gets too sour, add 1 t baking soda to reduce the acid.

To prepare pancake batter, mix: 1 c starter 2 c flour
2 c warm water

Allow to stand overnight. Always save 1/2 c of the mixture to continue yeast strain and taste; replenish starter batch with equal parts flour and water. In the morning, add:

2 T brown sugar or honey
4 T warm bacon grease or margarine
4 T egg powder
1 t baking soda
2 T powdered milk
1/3 c water

Mix batter, adding water as necessary. Skillet should be extra hot so that pancakes will cook quickly--otherwise they will be tough.

This recipe makes approximately 18 pancakes. Complements are:
4 T egg powder : 2 c flour

Wild raspberries or blueberries are excellent in pancakes.

Syrup

Warm a mixture made from one part water, two parts brown sugar or honey, and one part margarine.

Scrambled Eggs

Dehydrated egg mixtures vary, but usually 2 T egg powder equals 1 medium fresh egg. To make the equivalent of two scrambled eggs:

Mix: 4 T egg powder
1/3 c water
salt and pepper

Fry in oil or margarine.

For Mexican eggs, add: 1 t presoaked dehydrated onion
1 t presoaked dehydrated green pepper
1 t tomato crystals
dash of garlic powder

For cheese omelet, add: 2 T grated cheese to basic egg recipe.

For bacon and egg omelet, add: 2 T dehydrated bacon bits.

Eggs are good with whole wheat biscuits and honey.

The Breakfast Meal

Item	Portion	Cal	Grams Complemented Protein	Calories from Fat Source
Biscuits	1 average	101	2.3	24
Bulgar, fried with cheese	1/2 c dry & 1-1/2 oz	400	7.9	141
Cocoa	1 c liquid	174	5.7	50
Eggs	4 T dry	154	11.4	72
Granola	1 c	690	18.0	183
Margarine	1 T	115	0	114
Milk, dry	2 T	80	3.4	20
Muesli	1 c	521	13.2	195
Oatmeal	1/2 c dry	166	5.8	Insignificant
Pancakes	3 average	258	5.7	54
Raisins	2 T	54	Insignificant	Insignificant
Soy grits	1 T	41	4.2	8
Sugar	2 T	104	0	0
Sunflower seeds	1 T	70	1.4	35
Wheat, cracked	1/2 c dry	219	5.6	Insignificant

LUNCH AND MUNCHIES

Lunch is a simple affair: bannock, biscuits or bread;
cheese, peanut butter spread or salami;
dried fruit or munchies.

Often backpackers don't stop for lunch, but snack throughout the midday.

Following are several hearty lunch breads. I usually make up the Logan bread, flapjacks, and flatbread ahead of time, and bake biscuits, bannock, and bread while on trail.

Whole Wheat Bread Mix

Combine: 2 c whole wheat flour
2 c white flour
1 t salt
1/4 c shortening or oil
2 T molasses or honey
1/2 c powdered milk
4 t baking powder

This mix, like the biscuit mix, can be made up dry and baked as needed. With this quantity, use: 1 T dry yeast
1-1/4 c warm water

It is a wise idea to make bread in a kitchen before trying it in the field, as a little experience can save a lot of frustration. I include baking powder in the bread mix so that if the yeast should die, the bread will still bake up. The white flour in the recipe makes the bread lighter, but a denser, fuller protein bread can be made using only whole wheat flour.

Complementary portions are: 1/2 c dry milk : 4 c flour

This recipe makes one large loaf, about 16 slices of bread.

Bannock

Bannock is a flat pan bread, usually made with baking powder as the leavening, which is either fried or baked in a skillet. I use the biscuit mix, allowing 1/3-1/2 c dry per person (1/2 c = 3 average sized biscuits).

Logan Bread

Mix: 3 c whole wheat flour
3 c white flour
2-1/2 c oatmeal
1-1/2 c brown sugar
1 c honey
1/2 c molasses
1/2 c powdered milk
1 c soy grits
6 eggs
1-1/4 c nuts
2 c raisins
3 t baking powder
2 t salt
2 c margarine
1 c oil

Stir well, pour into greased pan, and bake at 350 for 45 minutes or until done. Makes 4 9x9" cake tins, or about 20 large pieces of Logan bread. The bread is extremely rich, and one piece is enough per meal. It is an excellent winter camping bread, as the high oil content prevents it from freezing like other breads.

The complementary portions are: 8-1/2 c grains : 1 c soy grits
1-1/4 c nuts : 1/2 c milk powder

Flapjacks (Oatmeal Bars)

Mix: 2 c white sugar
2 c margarine
1/3 c honey
1/3 c syrup
9-1/2 c rolled oats
1 c peanuts or almonds
1-1/4 c soy grits
1/3 c powdered milk

Pour batter into well greased pans, pressing dough into a compact layer. Bake at 350 for 20 minutes or until golden brown. Remove from oven, cut into squares, but do not remove from pan until cool. Makes 4 9x9" cake tins, or about 20 large squares.

Flapjacks are a traditional Outward Bound trail food, and they are the mainstay of lunches at the Minnesota School. They are usually packed in milk cartons to protect them from crumbling, and are served two per person per meal. They are quite filling, however, and I often pack one flapjack and one piece of flatbread per meal.

Complementary portions are: 1-1/4 c soy grits : 9-1/2 c grain
1 c peanuts : 1/3 c milk powder

Flatbread

Combine: 2 c whole wheat flour
1 t salt
2 T shortening
1/4 c powdered milk
2/3 c water

Knead until smooth, adding more flour if necessary. Roll out on large greased cookie sheet to 1/4" thickness. Bake at 350 until golden brown. Makes 12 large pieces of flatbread.

Complementary portions are: 2 c flour : 1/4 c powdered milk

Tortillas

Tortillas are not a standard trail bread, but they cook very quickly and are useful when fuel is short. Make up regular biscuit mix, kneading the dough until it is smooth. Pinch off a ball of dough and flatten until it is paper thin. Use as little oil in the skillet as possible--tortillas should pan bake rather than fry. One cup biscuit mix makes 6 tortillas.

Peanut Butter Spreads

Equal portions of peanut butter and sesame butter complement each other. Peanut butter may also be complemented by combining:

1 c peanut butter & 6 T powdered milk
1 c peanut butter & 4 T powdered milk & 1/2 c sunflower seeds

Gorp

Gorp has has many recipes as granola does. Again, this one is basic and can easily be modified.

Combine: 1 c chocolate bits
7/8 c peanuts
1 c sunflower seeds
1 c raisins
1 c coconut

This makes about 5 cups or 15 1/3 c servings.

Complements are: 1 c sunflower seeds : 7/8 c peanuts.

Roasted Soybeans

Roasted soybeans have a nut-like flavor and are excellent munchies, especially when properly complemented. Most natural food stores sell them, but they can be made at home quite easily.

Soak 2 c soybeans in 6 c water for 24 hours; if beans absorb all of the water, add more. Spread beans on cookie tray (one with sides is best) or in cake pans. Dribble about 3 T oil over the beans, and sprinkle with salt. Bake at 300-350 until the beans are no longer soft, but be careful not to over bake. Bake 1-2 hours. This recipe makes 2 c roasted soybeans.

Soybean-Seed Snack

Combine: 1/3 c roasted soybeans
7/8 c sunflower seeds
3/4 c peanuts

This makes about 2 cups, or six 1/3 c servings. These items complement each other in the given proportions.

Lunch and Munch Foods

Item	Portion	Cal	Grams Complemented Protein	Calories from Fat Source
Bannock	1 lge. piece (1/2 c dry mix)	303	6.9	72
Biscuit mix	1 c dry	606	13.8	144
Bread	1 slice	157	3.0	29
Cheese	1" cube	112	7.1	35
Chocolate chips	1/3 c	287	1.7	142
Dried fruit	1/3 c	133	1.3	Insignificant
Flapjack	1 square	508	10.2	146
Flatbread	1 piece	101	2.3	24
Gorp	1/2 c	350	5.0	143
Honey	1 T	62	0	0
Jam	1 T	55	0	0
Logan bread	1 piece	718	10.4	165
Peanut-sesame spread	2 T	140	4.0	70
Raisins	1/3 c	143	1.2	Insignificant
Salami	1 slice	130	4.8	97
Soybean-seed Snack	1/3 c	289	6.6	132

DINNER

Grains and Legumes

Rice, lentils, millet, barley, beans, and bulgar can be pre-soaked to shorten cooking time. Per person:

Soak 1/2 c grains plus 1 T soy grits in 1 c water

When ready to cook, add a dash of salt and bring to a boil. Boil for 5 minutes. Cover, move to a lower fire, and simmer for:
40-45 minutes for rice, beans, lentils
30 minutes for millet, barley, bulgar
Don't peek, as this will allow the steam to escape and the grain will not cook properly. Also, do not stir, or the grain will burn. Milled grains would cook in about half the required time.

Bulgar and millet are particularly good if they are sauteed in oil before being boiled. This tends to bring out a nut-like flavor, and cuts cooking time by about 7 minutes. The grain is ready to be boiled when the kernels have burst open, or popped, like corn.

Complements are: 1/2 c grain : 1 T soy grits
1/2 c beans : 6 T grated cheese

Beans and legumes should be served with a milk or cheese product. White sauce, cheese sauce, parmesan cheese, and cocoa are all good complements.

Mixed Grain Dinner

A self-complementary meal may be made by combining:

1/2 c split peas	1/2 c millet
1/2 c soy grits	1 c rice
1/2 c bulgar	1/2 c barley

This quantity serves 7. Complements are: 1 c legumes : 2-1/2 c grain

Curried Rice

Add curry powder, to taste, to cooked rice. Serve with raisins, coconut, peanuts, and sunflower seeds saved from a lunch meal.

Lemon Rice

Before cooking rice, add 1/4 t mustard seeds and 1/2 t tumeric per person. Cook rice, and add to taste: lemon juice, red pepper and margarine.

Chili

Add chili powder and dry red peppers to the tomato sauce. Pour milled pinto beans (1/2 c per person) into sauce and simmer for 20-25 minutes. Cornbread is a good companion to this dish. A slice of cheese in the chili or with the cornbread will complement the beans.

Pasta: Noodles, Macaroni, Spaghetti

Although pastas do not have as much protein as grain, they cook quicker and provide variety. Whole wheat pastas, available in natural food stores, contain more protein than commercial brands. Per person:

Boil: 1-1/2 c water
Add: 1/2 c whole wheat pasta dash of salt

Boil uncovered for 10 minutes, stirring occasionally. When cooked, drain the noodles and save the water, as it contains starch and can be used in making the sauce. Pastas, like beans, should be eaten with milk products.

1/2 c pasta : 1-1/2 T grated cheese or 1 T powdered milk

Chowder

A hearty chowder can serve as a main dish, or prelude a grain meal (milk complements the grain). My favorite is fish chowder:

Add: 1 c water to 1/4 c non-instant milk (1/3 c instant).
Mix well and place over moderate heat.
Add: 2 T margarine salt and pepper to taste
1 t dehydrated onions or 2 t fresh onion, chopped
1 t dehydrated peppers or 2 t fresh peppers, chopped
1/2 c thoroughly cooked fish

Serve when steaming. Makes one large or two small servings. Parched corn, dehydrated potato chunks, or canned vegetables can be used for a vegetarian chowder.

SAUCES

White Sauce

Melt: 2 T margarine
Stir in: 2 T flour (biscuit mix will do in a pinch)
1/4 c powdered milk
Add: 1 c water

Blend well. Slowly bring to a boil, stirring constantly. Cook until thick. Season with salt and pepper. Makes 1 c, or 4 portions.

Cheese Sauce

Make white sauce, adding 1/2 c grated cheese. Serve with macaroni or over grains.

Tomato Sauce

Simmer: 1/2 c tomato flakes
1 T dehydrated onions
1 T dehydrated peppers
salt and pepper
2 t tomato sauce spices
2 c water

This makes 4 1/2 c portions. Serve over pasta or grains.

Lemon Sauce for Fresh Fried Fish

Combine: 1/3 c margarine
salt & pepper
3 T lemon juice
dash garlic powder

Heat until margarine is melted, and serve over fish. Makes about 1/2 c sauce.

Stroganoff Sauce

Add a dash of nutmeg to 1/2 c sour cream powder and 1 c water, for 1 c sauce.

Note on Sauces

The sauce may be made in a separate pot, or the ingredients may be combined with the grain as it cooks. In the case of pasta, drain off about half the cooking water before adding the sauce ingredients, and delete the 2 c water called for in the sauce recipe.

BREADS

Cornbread

Mix: 2 T melted shortening
1/3 c powdered milk
2 T egg powder
3/4 t salt
2 T soy grits
1 c flour
3/4 c corn meal
1/3 c sugar
3 t baking powder
1 c plus 2 T water

Bake in shallow, greased pan, 8x8" in hot reflector oven, about 425 for 20 minutes. Makes 9 pieces. Complements are:
3/4 c corn meal : 2 T soy grits & 4 T powdered milk

Dumplings

Mix well: 1/2 c biscuit mix
3 T water

Spoon into boiling stew or soup. Cook 10 minutes uncovered and 10 minutes covered. Makes 4 dumplings.

Garlic Biscuits, Cheese Biscuits

Follow biscuit recipe, adding 1/2 t garlic powder per cup biscuit mix for garlic biscuits, and 2 T grated cheese per cup for cheese biscuits.

Cheese Fritters

Mix: 1 c biscuit mix
1/3 c water

Stir well and knead until smooth. Break off a ball of dough and flatten it. Place a small piece of cheese in the center and wrap it in the dough, pinching the edges closed. Deep fat fry until golden brown. Makes 8-10 small fritters.

DESSERTS

Coffee Cake

Mix well: 2 c biscuit mix
1/2 c water
2 T sugar or honey

Pour in greased pan. Sprinkle on topping:

1/3 c brown sugar
1/3 c oatmeal
1/4 c margarine
1 t cinnamon

Bake for 25 minutes or until firm. Serves 6. This dessert is also good with raisins, dry fruit, or jelly baked into it.

Pie

Mix well: 1 c biscuit mix
1 T water
1/4 c shortening

Flour hands to prevent sticking. Pat into pan, bringing edges up. Bake 10 minutes. Makes one 9" shell. Fill with stewed apples, fruit compote, raspberries or blueberries. Top with a sprinkle of cinnamon and several bits of margarine.

Stewed Apples or Fruit Compote

Soak dehydrated apples or dried fruit mixture. Add a dash of cinnamon and honey. Cook over low heat until tender.

Rice Pudding

If the dinner rice or millet has been cooked separately from the sauce, this dish is a good way of using the leftovers. Per person:

Combine: 1/2 c cooked rice or millet
1 T powdered milk
2 T raisins
1 T honey or sugar
1/2 t cinnamon

Simmer for five minutes, stirring constantly.

Complements are: 1/2 c cooked rice : 1 T powdered milk

The Dinner Meal

Item	Portion	Cal	Grams Complemented Protein	Calories from Fat Source
Cheese fritters	2 small	241	3.8	138
Cheese sauce	1/4 c	130	4.6	60
Coffee cake	1 piece	368	5.5	123
Dumplings	1 dumpling	151	3.7	36
Fish chowder	1/2 c	272	13.4	120
Grain, mixed	1/2 c dry	303	6.6	Insignificant
Lentils	1/2 c dry	340	11.2	Insignificant
Macaroni	1/2 c dry	207	3.5	Insignificant
Parmesan cheese	1-1/2 T	112	7.1	35
Pudding	1/2 c cooked	180	3.9	45
Rice	1/2 c dry	315	4.8	Insignificant
Rice pudding	1/2 c cooked	336	5.0	Insignificant
Spaghetti	1/2 c dry	176	4.0	Insignificant
Stewed apples	1/2 c dry	100	0	0
Soy protein*	1/4 c	65	8.2	13
Tomato sauce	1/4 c	79	.3	0
White sauce	1/4 c	108	1.8	56

*Also called textured vegetable protein, TVP, or meat substitute.

The Charts

The following section lists the nutritive values of foods for winter camping, desert backpacking, river rafting, sailing, mountain trips, short and long expeditions, solos and group trips.

I have not included values for pre-packaged commercial trail food, and although I have listed meat products, I do not recommend extensive menuing of meat on trail.

Dairy Products, Fats, and Oils

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Cheese						
Cheddar	1 oz (1" cube)	113	5.0	5.0	35	Dairy products considered complete protein.
Parmesan	1 oz (1" cube)	112	7.1	7.1	33	
Processed	1 oz (1" cube)	90	3.6	3.6	27	
Eggs						
Dry, whole	1 T	41	2.8	2.8	20	
Fresh	1 medium	77	5.7	5.7	38	
Milk						
Dry, skim instant	1-1/3 c dry	434	34.0	34.0	17	
Skim, noninstant	1 c dry	434	34.0	34.0	4	
Whole	1 c dry	630	27.0	27.0	176	
	1 T dry	40	1.7	1.7	11	
Whole	1 c liquid	116	6.9	6.9	5	
Sour cream	1 c	485	7.0	7.0	423	
Fats						
Butter	1 T	108	0	0	108	No protein to complement
	1 c	1604	0	0	1604	
Bacon fat	1 T	126	0	0	126	
Crisco	1 T	110	0	0	110	
	1 c	1768	0	0	1768	
Margarine	1 T	115	0	0	114	
	1 c	1840	0	0	1824	
Mayonnaise	1 T	92	.1	.1	90	
Oil	1 T	124	0	0	124	
	1 c	1945	0	0	1945	

Grain and Grain Products

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Grains						
Barley	1/2 c dry	315	6.7	8.7	Insign.	Per 1/2 c grain:
Bulgar	1/2 c dry	209	3.9	5.4	in most	
Millet	1/2 c dry	270	5.9	7.0	grains	1 T soy grits
Oats	1/2 c dry	166	3.9	5.8		or
	1 c dry	333	7.9	11.7		2 T powdered milk
	1 c cooked	148	3.5	4.9		or
Rice, brown[1]	1/2 c dry	315	4.8	6.8		3 T grated cheese
white	1/2 c dry	318	3.9	5.8		
converted	1/2 c dry	316	4.8	6.7		
Rye, grain	1/2 c dry	350	6.6	8.5		
Wheat, grain	1/2 c dry	297	7.5	9.4		
cracked	1/2 c dry	219	3.6	5.6		
germ	1 T	18	.8	.9		
Grain Products[2]						
Cream of wheat	3/4 c cooked	102	2.1	3.4		
Macaroni,	1 c cooked	209	3.6	4.9		Per 1/2 c dry noodles:
whole wheat	1/2 c dry	207	3.5	4.2		
Noodles, egg	1 c cooked	107	2.1	3.4		Same as grain
whole wheat	1/2 c dry	287	5.5	8.1		
Popcorn	1 c popped	54	.6	-		
Spaghetti	1/2 c dry	176	3.0	4.0		
whole wheat						

[1]Although protein values for brown and converted rice are similar, brown rice contains vitamins which are lost through processing.

[2]Usable protein figures are not available for enriched white flour macaroni, noodles, and spaghetti. Protein values are lower than comparable whole wheat products, although calories and fat content are the same.

Flour and Breads

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Flour						
Barley flour	1 c	401	6.8	8.8	Insign.	Per 1 c flour:
Cornmeal	1 c	527	5.9	7.9	in most	
Graham flour	1 c	424	8.9	10.9	flour	2 T non-instant milk
Rye flour (medium)	1 c	326	6.6	8.6		or
Soy flour (medium)	1 c	323	22.8	27.8	72	2 T soy grits
White enriched	1 c	401	4.7	6.4		
Whole wheat	1 c	400	9.6	11.6		
Bread[1]						
Bread, whole wheat	1 thin slice	55	1.3	1.3	Insign.	Recipe complementary
white	1 slice	63	.8	-	Insign.	
Biscuit	2 small, 1 average	109	2.0	2.3	24	Recipe complementary
Cinnamon bun	1 average	158	1.8	2.2	23	Biscuit mix base
Coffee cake	1 average piece	368	5.5	5.5	123	Biscuit mix base
Cornbread	1 average piece	185	3.8	4.4	27	Recipe complementary
Crackers						
Graham	1 piece	28	.3	-	-	
Pilot	1 piece (19 to lb.)	101	.8	-	-	
Uneeda	1 biscuit	23	.2	-	-	
Ry-Krisps	1 double square wafer	20	.4	-	-	
Pancakes	1 average	164	4.0	4.0	36	Biscuit mix base
Biscuit mix	1 c dry	574	11.2	13.1	250	Recipe complementary
Logan bread	1 piece	618	8.6	10.4	165	Recipe complementary
Flapjack	1 piece	508	10.2	10.2	146	Recipe complementary

[1]Usable protein figures are not available for commercial bread and crackers.

Legumes, Nuts, and Seeds

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Legumes						
Beans (navy)	1/2 c dry	338	8.2	12.4	Insign.	Per 1/2 c legume:
Black beans	1/2 c dry	342	10.0	14.2	in most	
Cow peas	1/2 c dry	340	10.4	14.6	legumes	1/4 c egg powder
Chick peas	1/2 c dry	360	12.2	16.4		or
Kidney beans	1/2 c dry	336	8.8	13.0		1/4 c non-instant milk
Lima beans	1/2 c dry	225	7.1	9.9		or
Lentils	1/2 c dry	340	7.0	11.2		6 T grated cheese
Peas, dry split	1/2 c dry	344	11.2	15.4		
Soybeans & grits	1/2 c dry	330	21.7	25.6	33	
Nuts & Seeds						
Almonds	12-15 nuts	90	1.0	-	51	See recipe for
Cashews[1]	6-8 nuts	88	1.6	2.2	41	Soybean-Seed Snack
Peanuts	7/8 c	559	11.5	16.1	280	
Peanut butter	1 T scant (1/2 oz)	86	1.6	2.2	43	
	1 c	1486	28.9	40.4	743	
Pumpkin & Squash seeds	7 T	541	18.5	24.5	-	
Sesame seeds	2/3 c	586	10.3	14.9	301	
Sesame butter	1/3 c	586	10.3	14.9	301	
Sunflower seeds	1/2 c	560	8.6	11.2	280	
Walnuts, black	8-10 halves	94	1.3	1.9	60	
Mixed nuts	8-12 nuts	94	1.3	1.9	60	

[1]Cashews are the best balanced of the nuts, and are excellent complementors for legumes.

Meat, Chicken, Fish

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Chicken						
Chicken	1/2 breast (4 oz raw)	232	18.1	18.1	63	Meat is considered complete protein
Fish						
Haddock	1 fillet (3"x3"x1/2")	214	18.8	18.8	7	
Mackeral, canned	1 piece (4"x2"x3/4")	180	16.9	16.9	100	
Salmon, canned	2/3 c	143	16.4	16.4	10	
Sardines, canned	1 piece	169	7.3	7.3	19	
Tuna	3/8 c	145	9.5	9.5	12	
Meat						
Bacon	1 strip	48	1.2	1.2	35	
Bacon, Canadian	1 slice	57	4.4	4.4	27	
Beef						
Corned, canned	1 slice	65	5.3	5.3	12	
Dried, chipped	2 thin slices	61	7.2	7.2	18	
Hamburger	3-1/2 oz raw	321	11.2	11.2	60	
	1 medium cooked	246	10.2	10.2	49	
Bologna	1 slice (4-1/2"x1/8")	66	2.9	2.9	18	
Deviled meat	1 rounded T	50	1.9	1.0	15	
Ham, fresh	1 slice (4"x2-1/2"x1/8")	120	4.8	4.8	37	
Salami	1 slice (3-3/4"x1/4")	130	4.8	4.8	96	
Sausage	1 piece (2-1/4"x1-1/2")	252	4.6	4.6	198	
Meat Substitute						
Textured vegetable Protein	1/4 c (19 grams)	65	6.0	6.0	27	

Beverages, Soup, and Sauces

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Beverages						
Cocoa	1 c (6 oz)	174	5.7	5.7	81	Dairy products whole protein
Coffee	1 c	0	0	0	0	
Lemonade	1 large glass	104	0	0	0	
Milk, fat free	1 c (8 oz)	87	7.1	7.1	1	Other items have insign. protein value
Whole	1 c (8 oz)	166	7.0	7.0	7	
Tea	1 c	0	0	0	0	
Orange juice	4 oz crystals (7 servings)	430	.3	.3	0	
Tang	2 rounded T	61	0	0	0	
Soup						
Canned soup	(3 servings per can)					
Chicken noodle	1 serving	56	1.2	1.2	14	
Beef veg	1 serving	61	3.3	3.3	13	
Green pea	1 serving	110	2.7	3.0	15	
Cream mushroom	1 serving	185	4.1	4.1	50	
Cream tomato	1 serving	141	4.1	4.1	38	
Dehydrated soup	(2 oz = 4 servings)					
Chicken noodle	1 serving	55	1.2	1.2	13	
Tomato veg with noodles	1 serving	61	.5	.5	13	
Sauces						
Cheese sauce	2 T	65	2.3	2.3	27	
Chocolate sauce	2 T	87	.9	.9	25	
Tomato sauce	1/4 c	78	.3	.3	0	
White sauce	2 T	54	.9	.9	29	
	1 c	426	9.0	9.0	230	

Sweeteners and Desserts

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Sweeteners						
Honey	1 T	62	.1	.1	0	Protein values of these foods small, so no complement has been listed
	1 c	992	1.0	1.0	0	
Jam	1 T	55	.1	.1	0	
Maple syrup	1 T	50	0	0	0	
Molasses	1 T	43	0	0	0	
blackstrap	1 c	698	0	0	0	
Sugar, brown	1 T	52	0	0	0	
	1 c	814	0	0	0	
white	1 T	48	0	0	0	
	1 c	770	0	0	0	
Desserts						
Cake mix	1 package	2540	9.3	9.3	-	
Cookies, fig bar	1 bar	53	.1	.1	-	
Vienna sandwich	1 cookie	70	.3	.3	-	
Brownie	1 piece (2"x2"x3/4")	141	.7	.7	-	
Pie, blueberry	1 medium piece	365	1.8	1.8	-	
Pudding	1/2 c cooked	180	3.9	3.9	48	
Rice pudding	1/2 c cooked	315	4.8	4.8	Insign.	
Shortcake	1 ser with 1/2c berries	347	1.9	1.9	Insign.	
Candy						
Milk chocolate	1 oz	145	1.5	1.5	46	
	1 large bar (4-1/2 oz)	693	8.1	8.1	231	
	1 regular bar	270	3.4	3.4	90	
Candy bar w/ nuts	1 bar (2 oz)	271	2.2	2.2	68	
Mars, Milky Way	1 bar (1-1/8 oz)	121	.9	.9	40	
Hard candy	1 oz	110	0	0	0	
Chocolate bits	1 c	860	5.0	5.0	425	

Fruit

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Apple, raw	1 medium	76	.6	.6	Insign. in fruit	Protein values of these foods small, so no complement has been listed
Dehydrated	1/4 c	100	.5	.5		
Apricots, dry	4-6 halves	79	1.6	1.6		
Banana flakes	1 c	340	4.0	4.0		
Blueberries, raw	1 c	85	.8	.8		
Coconut	1 c	450	3.0	3.0		
Currants	1/2 c	268	2.3	2.3		
Dates	3-4 pitted	85	.6	.6		
	1 c	505	3.9	3.9		
Figs, dry	2 small	81	1.2	1.2		
Fruit cocktail (canned)	1/2 c fruit & juice	70	.4	.4		
Orange	1 medium	68	1.4	1.4		
Peaches, canned	2 halves	68	.4	.4		
Dry	12 medium halves	265	3.0	3.0		
Pears, canned	2 halves	68	.2	.2		
Prunes, dry	3 medium, 4 small	67	.6	.6		
Raisins	1 c	429	3.7	3.7		

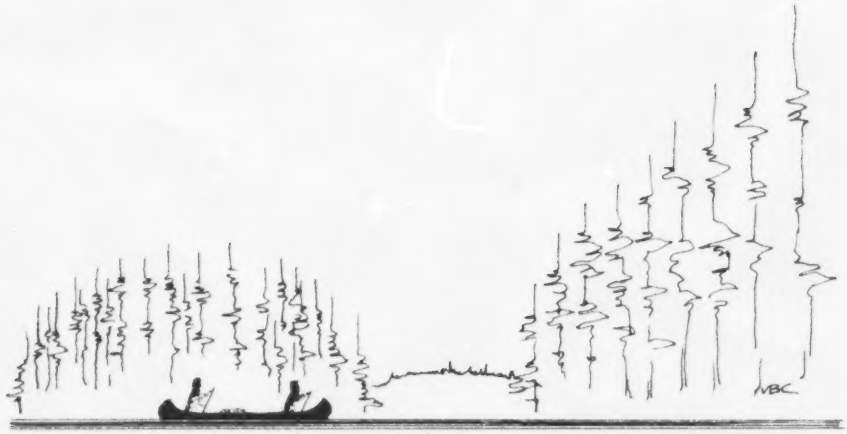
Vegetables

Food Item	Portion	Calories	Grams Usable Protein	Grams Complemented Protein	Calories from Fat Source	Protein Complementor
Carrots, raw	1 large, 2 small	42	.6	.6	Insign. in vege-tables	Protein values of these foods small, so no complement has been listed
Dehydrated	1/4 c	43	.2	.2		
Corn, canned	1/2 c	70	.6	.6		
Beans, waxed canned	1/2 c	14	.4	.4		
Lima beans frozen	3 rounded T (3-1/2 oz)	109	3.2	3.2		
Onions	1 raw	45	.7	.7		
Dehydrated	2 rounded T	35	.5	.5		
Peas, frozen	1/2 c	75	2.9	2.9		
Potatoes, raw	1 medium	83	1.2	1.2		
Dehydrated	1/4 c	44	.5	.5		
Tomato puree	1 c canned puree or 1/2 c paste or 1/2 c crystals	90	2.2	2.2		

Food Supplements

Brewers yeast	1 T	27	1.8	1.8	Insign.
Protein milk	1 T dry	39	2.3	2.3	Insign.
Tigers milk	1/4 c dry	100	5.0	5.0	Insign.

The Expedition Food List



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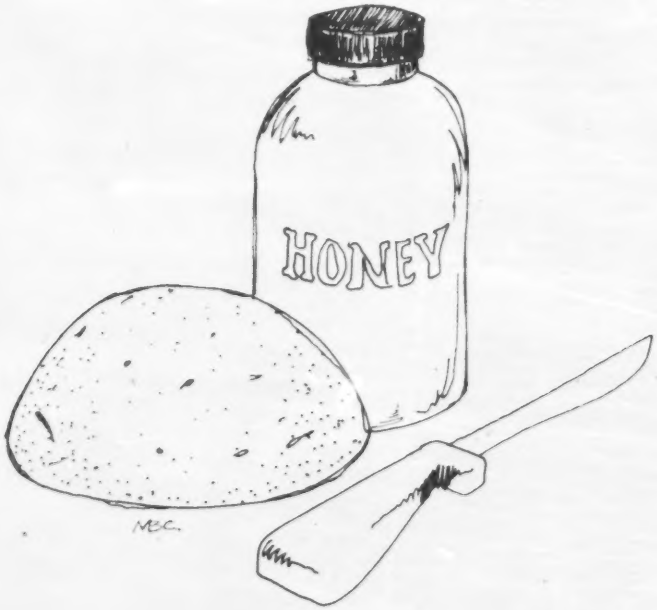
For the seven week canoeing trip, we packed: 49 cloth bags of food, each containing a day's worth of food; a Spice Bag; a Commissary Bag (tomato crystals, coffee, etc.); and bulk packed items such as margarine, peanut butter, crisco, and honey. Because food costs change so quickly, prices have not been included. Each day's food bag contained:

Food Item	Per Person per day	Total quantity for 49 Days
General		
18 envelopes cocoa	3 c cocoa	882 envelopes cocoa
6 teabags	-	392 teabags
1 pound biscuit mix	-	49 pounds
1-1/2 c brown sugar	2 T	74 cups, 37 pounds
2 c powdered milk	-	98 cups, 20 pounds
Breakfast		
1 breakfast		
#1 bulgar, 4 c dry	2/3 c	52 c, 26 pounds
#2 rolled oat & wheat mix 4 c dry	2/3 c	28 c, 10 pounds
#3 rolled rye & sunflower seeds, 4 c dry	2/3 c	48 c, 10 pounds
#4 granola, 6 c	1 c	72 c, about 20 pounds
Lunch		
1 pound cheese	2-2/3 oz	49 pounds
1 pound nuts	2-2/3 oz	49 pounds
1 pound raisins	2-2/3 oz	49 pounds
1 pound dried fruit	2-2/3 oz	49 pounds
6 oz chocolate bits	1 oz	about 7 pounds
6 oz lemonade mix	1-1/2 c	about 7 pounds

Food Item	Per Person per day	Total quantity for 49 Days
Dinner		
1 dinner		
#1 lentils or millet 2 c dry	1/3 c	24 c, 12 pounds
#2 grain mix or chili 2 c dry	1/3 c	24 c, 12 pounds
#3 split peas, 3 c dry	1/2 c	36 c, 18 pounds
#4 rice (brown or wild) 2 c dry	1/3 c	24 c, 12 pounds



Additional Food Included

Food Item	Total quantity for 49 days
Bulk packed food	
Margarine, 1 c per day (except last two weeks)	33 c, 16 pounds
Crisco, 1 c per day	49 c, 25 pounds
Peanut butter, 1/2 c per day	25 c, 12-1/2 pounds
Honey	1 gallon
17 desserts (1 every 3 days)	
8" layer cake	3 mixes
egg custard (1-1/2 qt portion)	7 bags
pudding (1 qt portion)	7 bags
Commissary items	
Sour cream powder	#10 can
Tomato crystals	#10 can
Dehydrated onions	4 c
Dehydrated peppers	3 c
Powdered eggs	#10 can
Extra biscuit mix	5 pounds
Cornmeal	4 pounds
Yeast	10 packets
Coffee	2 lge. jars instant 3 pounds grounds
Lemon juice	3 plastic lemons
Soup	25 envelopes (3 servings of 1/2 c each per envelope 1/2 c soup base
Bouillon, beef	1 large jar
chicken	1 large jar
onion	1 small jar

Food Item	Total quantity for 49 days
Spices	
Salt	pounds
Pepper	2 cups
Garlic powder	1 large jar
Onion powder	1 small jar
Curry	1/2 c
Chili powder	1/3 c
Chili peppers	1 small jar
Tomato sauce spices	3 c
Parsley	2 c
Cayenne	1 small can
Cinnamon	2 large jars
Indian seasonings (pre-measured for lemon rice)	3 meals worth
Nutmeg	1 small jar
Special treat	
Fig bars	2 packages

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